

CLAIMS

What is claimed is:

- 1 1. A method for routing signals in a telecommunications network, comprising the steps of:
2 (a) receiving an incoming signal;
3 (b) slicing data in the incoming signal into a plurality of sub-signals;
4 (c) for each sub-signal:
5 (1) dividing the sub-signal into one or more subsets of data;
6 (2) applying a checksum function to each subset of data to generate a checkbit for the subset;
7 (3) adding the checkbit for each subset to the sub-signal to generate an augmented sub-signal;
8 (4) routing at least two copies of the augmented sub-signal in parallel through redundant portions
9 of a distributed switch fabric to generate at least two routed sub-signals for the sub-signal;
10 (5) performing a checksum analysis on at least one of the routed sub-signals; and
11 (6) selecting one of the routed sub-signals in accordance with the checksum analysis; and
12 (d) combining data from the selected routed sub-signals corresponding to the plurality of sub-signals
13 to generate the outgoing signal.
- 1 2. The invention of claim 1, wherein step (a) comprises the step of terminating overhead data in
2 incoming signal, wherein the checkbits replace at least some of the terminated overhead data during
3 routing through the distributed switch fabric.
- 1 3. The invention of claim 2, wherein the size of each subset of data in each sub-signal is selected
2 such that the addition of the checkbits does not increase the size of the data routed through the distributed
3 switch fabric relative to the size of the data in the incoming signal.
- 1 4. The invention of claim 3, wherein the incoming signal is in a SONET format and further
2 comprising the step of buffering a sufficient amount of data to ensure errorless protection switching upon
3 detection of a fault during the checksum analysis.
- 1 5. The invention of claim 4, wherein the selection of routed sub-signals for each sub-signal is
2 independent of the selection of routed sub-signals for each other sub-signal.
- 1 6. The invention of claim 4, wherein the selection of routed sub-signals for any one sub-signal
2 affects the selection of routed sub-signals for all other sub-signals.

1 7. The invention of claim 1, wherein the incoming signal is in a SONET format.

1 8. The invention of claim 1, wherein the selection of routed sub-signals for each sub-signal is
2 independent of the selection of routed sub-signals for each other sub-signal.

1 9. The invention of claim 1, wherein the selection of routed sub-signals for any one sub-signal
2 affects the selection of routed sub-signals for all other sub-signals.

1 10. The invention of claim 1, further comprising the step of buffering a sufficient amount of data to
2 ensure errorless protection switching upon detection of a fault during the checksum analysis.

1 11. An apparatus for routing signals in a telecommunications network, comprising:

2 (a) means for receiving an incoming signal;

3 (b) means for slicing data in the incoming signal into a plurality of sub-signals;

4 (c) for each sub-signal:

5 (1) means dividing the sub-signal into a plurality of subsets of data;

6 (2) means for applying a checksum function to each subset of data to generate a checkbit for the
7 subset;

8 (3) means for adding the checkbit for each subset to the sub-signal to generate an augmented sub-
9 signal;

10 (4) means for routing at least two copies of the augmented sub-signal in parallel through
11 redundant portions of a distributed switch fabric to generate at least two routed sub-signals for the sub-
12 signal;

13 (5) means for performing a checksum analysis on at least one of the routed sub-signals; and

14 (6) means for selecting one of the routed sub-signals in accordance with the checksum analysis;

15 and

16 (d) means for combining data from the selected routed sub-signals corresponding to the plurality of
17 sub-signals to generate the outgoing signal.

1 12. In a telecommunications network, a switch for routing one or more incoming signals to generate
2 one or more outgoing signals, comprising:

3 (a) a slicer for each incoming signal, wherein the slicer slices data in the incoming signal into a
4 plurality of sub-signals;

5 (b) a checkbit generator for each sub-signal, wherein the checkbit generator:

6 (1) divides the sub-signal into a plurality of subsets of data;
7 (2) applies a checksum function to each subset of data to generate a checkbit for the subset; and
8 (3) adds the checkbit for each subset to the sub-signal to generate at least two copies of an
9 augmented sub-signal;
10 (c) redundant portions of a distributed switch fabric, wherein the redundant portions route in parallel
11 the copies of each augmented sub-signal to generate at least two routed sub-signals for the sub-signal;
12 (d) a fault detector for each set of routed sub-signals, wherein the fault detector:
13 (1) performs a checksum analysis on at least one of the routed sub-signals; and
14 (2) selects one of the routed sub-signals in accordance with the checksum analysis; and
15 (e) a combiner for each outgoing signal, wherein the combiner combines data from the selected
16 routed sub-signals corresponding to the plurality of sub-signals to generate the outgoing signal.

1 13. The invention of claim 12, wherein step (a) comprises the step of terminating overhead data in
2 the incoming signal, wherein the checkbits replace at least some of the terminated overhead data during
3 routing through the distributed switch fabric.

1 14. The invention of claim 13, wherein the size of each subset of data in each sub-signal is selected
2 such that the addition of the checkbits does not increase the size of the data routed through the distributed
3 switch fabric relative to the size of the data in the incoming signal.

1 15. The invention of claim 14, wherein the incoming signal is in a SONET format and further
2 comprising buffers configured to buffer a sufficient amount of data to ensure errorless protection
3 switching upon detection of a fault by the fault detector.

1 16. The invention of claim 15, wherein the selection of routed sub-signals for each sub-signal is
2 independent of the selection of routed sub-signals for each other sub-signal.

1 17. The invention of claim 15, wherein the selection of routed sub-signals for any one sub-signal
2 affects the selection of routed sub-signals for all other sub-signals.

1 18. The invention of claim 12, wherein the incoming signal is in a SONET format.

1 19. The invention of claim 12, wherein the selection of routed sub-signals for each sub-signal is
2 independent of the selection of routed sub-signals for each other sub-signal.

1 20. The invention of claim 12, wherein the selection of routed sub-signals for any one sub-signal
2 affects the selection of routed sub-signals for all other sub-signals.

1 21. The invention of claim 12, further comprising buffers configured to buffer a sufficient amount of
2 data to ensure errorless protection switching upon detection of a fault by the fault detector.

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